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Listing of Claims

1. (Previously Presented) A process for the solid phase synthesis of peptides, which comprises:

- (a) deprotecting a first amino acid linked to a solid phase resin by removing protective first chemical groups;
- (b) activating chemical groups on a second amino acid to prepare the second amino acid for coupling with the first amino acid;
- (c) coupling the activated second amino acid to the deprotected first amino acid to form a peptide from the first and second amino acids; and
- (d) accelerating at least the deprotecting and coupling steps by applying microwave energy during the deprotecting, and coupling steps.

2. (Original) A process according to Claim 1 comprising cleaving the peptide from the solid phase resin while applying microwave energy to accelerate the cleaving step.

3. (Previously Presented) A peptide synthesis process according to Claim 1, comprising repeating the deprotecting, activating, and coupling cycle to add third and successive amino acids to form a peptide of a desired sequence.

4. (Original) A peptide synthesis process according to Claim 1, comprising successively deprotecting, activating, and coupling a plurality of amino acids into a peptide in a single vessel without removing the peptide from the solid phase resin between cycles.

5. (Original) A peptide synthesis process according to Claim 1, comprising proactively cooling the vessel and its contents during the application of microwave energy to thereby prevent undesired degradation of the peptide or acids by limiting heat accumulation that would otherwise result from the application of the microwave energy.

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6. (Original) A peptide synthesis process according to Claim 1, wherein the deprotecting step comprises deprotecting the alpha-amino group of the amino acid.
7. (Original) A peptide synthesis process according to Claim 1, further comprising deprotecting side chains on the amino acids of the peptide under microwave irradiation.
8. (Original) A peptide synthesis process according to Claim 1, wherein the activating step comprises activating the alpha-carboxyl group of the second amino acid.
9. (Original) A peptide synthesis process according to Claim 1, wherein the step of applying the microwave energy comprises limiting the application of microwave energy (spiking) to relatively short time intervals to thereby prevent undesired degradation of the peptide or acids by limiting heat accumulation that could be encouraged by the continuous application of the microwave energy.
10. (Original) A peptide synthesis process according to Claim 1 further comprising activating and coupling using a *in situ* method and a composition selected from the group consisting of phosphonium activators, uronium activators, HATU, HBTU, PyBOP, PyAOP, and HOBT.
11. (Original) A peptide syntheses process according to Claim 1 comprising monitoring the temperature of the vessel and moderating the applied power based upon the monitored temperature.
12. (Original) A peptide synthesis process according to Claim 1 comprising moderating the applied power based on the status of the reaction.

13-61 (Withdrawn)

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62. (Previously Presented) A process for the solid phase synthesis of peptides, which comprises:

- (a) deprotecting a first amino acid linked to a solid phase resin by removing protective first chemical groups;
- (b) activating chemical groups on a second amino acid to prepare the second amino acid for coupling with the first amino acid;
- (c) coupling the activated second amino acid to the deprotected first amino acid to form a peptide from the first and second amino acids;
- (d) accelerating at least the deprotecting and coupling steps by applying microwave energy during the deprotecting, and coupling steps; and
- (e) proactively cooling the vessel and its contents during the application of microwave energy to thereby prevent undesired degradation of the peptide or acids by limiting heat accumulation that would otherwise result from the application of the microwave energy.

63. (Previously Presented) A process according to Claim 62 comprising cleaving the peptide from the solid phase resin while applying microwave energy to accelerate the cleaving step.

64. (Previously Presented) A peptide synthesis process according to Claim 62 comprising repeating the deprotecting, activating, and coupling cycle to add third and successive amino acids to form a peptide of a desired sequence.

65. (Previously Presented) A peptide synthesis process according to Claim 62 comprising successively deprotecting, activating, and coupling a plurality of amino acids into a peptide in a single vessel without removing the peptide from the solid phase resin between cycles.

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66. (Previously Presented) A peptide synthesis process according to Claim 62 wherein the deprotecting step comprises deprotecting the alpha-amino group of the amino acid.

67. (Previously Presented) A peptide synthesis process according to Claim 62 further comprising deprotecting side chains on the amino acids of the peptide under microwave irradiation.

68. (Previously Presented) A peptide synthesis process according to Claim 62 wherein the activating step comprises activating the alpha-carboxyl group of the second amino acid.

69. (Previously Presented) A peptide synthesis process according to Claim 62 wherein the step of applying the microwave energy comprises limiting the application of microwave energy (spiking) to relatively short time intervals to thereby prevent undesired degradation of the peptide or acids by limiting heat accumulation that could be encouraged by the continuous application of the microwave energy.

70. (Previously Presented) A peptide synthesis process according to Claim 62 further comprising activating and coupling using a *in situ* method and a composition selected from the group consisting of phosphonium activators, uronium activators, HATU, HBTU, PyBOP, PyAOP, and HOBT.

71. (Previously Presented) A peptide synthesis process according to Claim 62 comprising monitoring the temperature of the vessel and moderating the applied power based upon the monitored temperature.

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72. (Previously Presented) A peptide synthesis process according to Claim 62 comprising moderating the applied power based on the status of the reaction.

73. (Previously Presented) A process for the solid phase synthesis of peptides, which comprises:

- (a) deprotecting a first amino acid linked to a solid phase resin by removing protective first chemical groups;
- (b) activating chemical groups on a second amino acid to prepare the second amino acid for coupling with the first amino acid;
- (c) coupling the activated second amino acid to the deprotected first amino acid to form a peptide from the first and second amino acids;
- (d) accelerating at least the deprotecting and coupling steps by applying microwave energy during the deprotecting, and coupling steps; and
- (e) repeating the deprotecting, activating, and coupling cycle to add third and successive amino acids to form a peptide of a desired sequence; and
- (f) successively deprotecting, activating, and coupling the third and successive amino acids into a peptide in a single vessel without removing the peptide from the solid phase resin between cycles.

74. (Previously Presented) A process according to Claim 73 comprising cleaving the peptide from the solid phase resin while applying microwave energy to accelerate the cleaving step.

75. (Previously Presented) A peptide synthesis process according to Claim 73 comprising proactively cooling the vessel and its contents during the application of microwave energy to thereby prevent undesired degradation of the peptide or acids by limiting heat accumulation that would otherwise result from the application of the microwave energy.

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76. (Previously Presented) A peptide synthesis process according to Claim 73 wherein the deprotecting step comprises deprotecting the alpha-amino group of the amino acid.

77. (Previously Presented) A peptide synthesis process according to Claim 73 further comprising deprotecting side chains on the amino acids of the peptide under microwave irradiation.

78. (Previously Presented) A peptide synthesis process according to Claim 73 wherein the activating step comprises activating the alpha-carboxyl group of the second amino acid.

79 (Previously Presented) A peptide synthesis process according to Claim 73 wherein the step of applying the microwave energy comprises limiting the application of microwave energy (spiking) to relatively short time intervals to thereby prevent undesired degradation of the peptide or acids by limiting heat accumulation that could be encouraged by the continuous application of the microwave energy.

80. (Previously Presented) A peptide synthesis process according to Claim 73 further comprising activating and coupling using a *in situ* method and a composition selected from the group consisting of phosphonium activators, uronium activators, HATU, HBTU, PyBOP, PyAOP, and HOBT.

81. (Previously Presented) A peptide syntheses process according to Claim 73 comprising monitoring the temperature of the vessel and moderating the applied power based upon the monitored temperature.

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82. (Previously Presented) A peptide synthesis process according to Claim 73 comprising moderating the applied power based on the status of the reaction.

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